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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/747,768	12/29/2003	Il-seok Han	299256/39905	6484

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EXAMINER

WILSON, CHRISTIAN D

ART UNIT	PAPER NUMBER
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2891

DATE MAILED: 06/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/747,768

Applicant(s)

HAN, IL-SEOK

Examiner

Christian Wilson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12292003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: search history.

DETAILED ACTION

Drawings

1. The drawings are objected to because the figures contain hand drawn figure and labels. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: 35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms which are not clear, concise and exact. The specification

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should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are: the use of the phrase "photo process" to describe ion implantation, etching, and oxide formation; describing the area key as having "a forward directional shape"; use of ungrammatical and poorly translated English.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1 – 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors. For example, claims 6 – 8 recite a selective etching process and an N-well photo process with no antecedent basis or clear understanding in English. Claim 7 recites a forward directional shape which is also indefinite.

6. Claim 1 recites the limitation "a silicon etching method". There is insufficient antecedent basis for this limitation in the claim since there is no previous claim of a silicon material. Further claim 11 recites a silicon etching which is indefinite for the same reason.

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7. Regarding claim 12, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang in view of Cerny *et al.* and Lu.

Yang (US 5,422,286) teaches a method for manufacturing an alignment key comprising the steps of preparing a semiconductor substrate **12** divided into a scribe lane region and a main chip region [Figure 14], depositing a mask layer **43** on the substrate, forming an area key and a first align key by selectively etching the mask layer using an N-type ion implantation mask [Figure 7], performing an N-type ion implantation **46** on the region where the mask layer is removed, and forming a second align key **52** in the area key formed by the removal of the mask layer [Figure 9] by etching the silicon substrate [Figure 11]. Yang teaches an oxide mask layer in the second etching process so it would have been obvious to one of ordinary skill in the art to use an oxide mask in the first etching step since it provides an effective etching mask [column 4, lines 30-35]. Yang does not teach an N-well implantation and a P-well implantation. Cerny *et al.* (US 6,020,226) teaches a P-type implantation using the etching mask for an alignment mark

[Figure 2L]. Lu (US 5,814,552) teaches N and P well implantations and an oxide mask layer for forming an alignment mark [Figure 7]. It would have been obvious to one of ordinary skill in the art to use second etching mask for a second implantation since Cerny *et al.* teaches that this provides a more accurate alignment of the implantation while reducing the number of need mask layers. It also would have been obvious to one of ordinary skill in the art to use the well implants of Lu since Lu teaches that the wells provide a twin-well structure with improved electrical characteristics.

Regarding claim 2, Yang further teaches a dual etching process [Figure 12].

Regarding claim 3, Yang further teaches an oxide film with a thickness of 500-2000 Å [column 4, line 2].

Regarding claims 4 and 5, Yang further teaches removal of an RIE etching before ion implantation [Figure 7]. It would have been obvious to one of ordinary skill in the art to remove the photoresist over the implantation region before implantation since it is well known that RIE etching using a photolithography process removes the photoresist over the etched region.

Regarding claim 6, Yang further teaches forming a step region by selectively etching the scribe lane region [Figure 8].

Regarding claim 7, Yang further teaches a trench size of 1-20 μm [column 3, line 58]. It would have been obvious to one of ordinary skill in the art to form a trench with a depth of 40 to 90 μm in a thicker substrate layer since Yang teaches that the trench should have a depth of 5-20% of a substrate.

Regarding claims 8 and 9, Cerny *et al.* further teaches using the alignment marks for ion implantation [Figure 2L]. It would have been obvious to one of ordinary skill in the art to use

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the alignments marks in Yang for the purposes of ion implantation since Cerny *et al.* teaches that this is a well known use of alignments marks for improved accuracy of the subsequent implantation.

Regarding claim 10, Yang further teaches silicon etching and oxide etching of the alignment pattern [Figure 12].

Regarding claim 11, Yang further teaches etching a second pattern with a depth of 1000 Å [column 4, lines 35-45].

Regarding claim 12, Yang further teaches a second alignment key with the same shape as the first alignment key [Figure 11].

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited prior art teaches method of forming alignment keys.

11. A copy of the EAST search history is enclosed.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian Wilson whose telephone number is (571) 272-1886.

The examiner can normally be reached on weekdays, 7:30 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'CDW', is positioned above the printed name of the examiner.

Christian Wilson, Ph.D.
Primary Examiner
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CDW